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ABSTRACT

This paper reports on the results of a study investigating attitude toward computing for a large group (n=509) of students undertaking an introductory information systems course in an Australian university. Students were surveyed using a two-part questionnaire. The first section dealt with gender, previous computing experience, and level of computer knowledge, and included other questions such as age, program of study, year of study, and mode of study (i.e., full-time or part-time). The second section consisted of 24 questions related to attitude to computing. Results show that age and gender do not appear to significantly influence attitudes to computing. However, previous computing background and level of computer knowledge do significantly influence attitudes to computing. Suggestions for future research are discussed. Four figures illustrate the breakdowns of: age in relation to previous computer experience; age in relation to level of computer knowledge; gender in relation to previous computer background; and gender in relation to level of computer knowledge. Two tables present the 24 questions on attitude toward computing and the observed Chi-square values of the four variables. Contains 11 references. (DLS)

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Attitudes of University Students to Computing: An Australian Perspective

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Abstract: This study reports on the results of a study investigating attitude to computing for a large group of students undertaking an introductory information systems course in an Australian university. The focus of this study is to determine whether the following factors: age, gender, previous computing background and computer knowledge, influence attitude of university students to computing. Our results show that age and gender do not appear to significantly influence attitudes to computing. However previous computing background and level of computer knowledge do significantly influence attitudes to computing.

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1. Introduction

The purpose of this study is to determine the attitude of university students to computing. We are interested in the following questions: "do age, gender, previous computing background and level of computer knowledge influence attitude to computing?"

With the above aims, the following four null hypotheses were formulated for this study:

1. There is no significant relationship between age and attitude to computing.
2. There is no significant relationship between gender and attitude to computing.
3. There is no significant relationship between previous computing background and attitude to computing.
4. There is no significant relationship between the level of computer knowledge and attitude to computing.

2. Methodology

A survey was conducted during the first class for students enrolled in an introductory information systems course in March 1997. The course teaches computer-based information systems in business organizations and practical hands-on lessons on word-processing and spreadsheet software.

The questionnaire is divided into two parts, A and B. Questions in part A are related to gender, previous computing background and level of computer knowledge. Previous computing background is measured in terms of number of years a student has used a computer. There are four categories: not at all, less than a year, between one and two years and more than two years. In this study, level of computer knowledge is defined as overall knowledge in word processing, spreadsheet and database software as well as programming skill. For each type of software and programming skill, students are asked to indicate what they believe to be their level of expertise in terms of none, basic, intermediate and advanced, each carrying weights of 1, 2, 3 and 4 respectively. The mean score, rounded to the nearest whole number, for these four questions is calculated to indicate the overall level of individual student's computer knowledge. A mean score of 1 indicates no computer knowledge at all, 2, 3 and 4 indicate basic, intermediate and advanced levels of expertise respectively. Part a also consists of other questions such as age (less than twenty years old, equal to or more than twenty years old), faculty which the student enrols in (Commerce, Informatics and others), year of study (first, second, third and above) and mode of study (full-time or part-time).

Part B of the questionnaire consists of twenty-four questions related to attitude to computing. These questions (see Table 1) were adopted from [Francis, 1993]. A five-point Likert scale, ranging from "strongly agree", "agree", "not sure", "disagree", "strongly disagree" was used. The question can be either a positive or negative statement. For example: "I feel at ease when I am around computers" is regarded as a positive statement, whereas "computers make me feel uncomfortable" is a negative statement. Questions relating to

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negative statements are coded in reverse order to those relating to positive statements. In this study, a positive statement is coded as 5 for "strongly agree", 4 for "agree", 3 for "not sure", 2 for "disagree" and 1 for "strongly disagree". On the other hand, a negative statement is coded in the reverse order (for example 1 for "strongly agree"). The attitude of each student is determined by calculating the mean score of the twenty four questions presented in Table 1. A student is considered to have a positive attitude if he or she has a mean score of 3 or more. Otherwise he or she is considered to have a negative attitude to computing.

1.	I feel at ease when I am around computers.
2.	I feel comfortable when a conversation turns to computers.
3.	Learning about computers is boring to me.*
4.	I like learning on a computer.
5.	Working with a computer would make me very nervous.*
6.	I feel aggressive and hostile toward computers.*
7.	Computers make me feel uncomfortable.*
8.	I get a sinking feeling when I think of trying to use a computer.*
9.	I would feel comfortable working with a computer.
10.	Computers make me feel uneasy and confused.*
11.	I am not the type to do well with computers.*
12.	I would like working with computers.
13.	The challenge of solving problems with computers does not appeal to me.*
14.	I think working with computers would be enjoyable and simulating.
15.	I do not enjoy talking with others about computers.*
16.	Learning about computers is interesting.
17.	I enjoy using a computer.
18.	Computers are boring.*
19.	Learning about computers is something I can do without.*
20.	Computers are not exciting.*
21.	Studying about computers is a waste of time.*
22.	It is fun to figure out how computers work.
23.	Learning about the different uses of computers is interesting.
24.	I enjoy learning how computers are used in our daily lives.

Table 1: Twenty-four questions on attitude to computing (*indicates negative statements)

3. Results

As the study involves bi-variate correlational problems, chi-square analysis is used.

3.1 Profile of Respondents

Five hundred and nine responses were collected, of which two hundred and seventy-eight were from male students and two hundred and thirty-one were from female students. There were four hundred and sixty-three full-time students and forty-six part-time students. There were three hundred and eighty-nine respondents enrolled in the faculty of commerce, whereas seventy-nine respondents enrolled in faculty of Informatics and forty respondents were from other faculties in the university. In addition, there were four hundred and thirty-two respondents who were first-year students, sixty-one respondents were second-year students, sixteen respondents were third- and fourth-year students. In terms of age category, there were three hundred and forty-five respondents who were less than twenty years old and one hundred and sixty-four respondents fell into the age category of equal to or more than twenty years old.

There were forty-five respondents with no computing experience at all, sixty-two respondents had less than one year of previous computing experience, ninety-four respondents had between one and two years of previous computing experience and three hundred and eight respondents had more than two years of previous computer experience. In terms of level of computer knowledge, one hundred and nine students considered themselves did not have any computer knowledge, two hundred and forty-three students were perceived to have basic level of computer knowledge, one hundred and thirty-two students were identified as having intermediate

level of computer knowledge and twenty-five students had advanced computer knowledge. Figures 1 and 2 show breakdown of age in relation to previous computing background and level of computer knowledge respectively. Figures 3 and 4 show breakdown of gender in relation to previous computing background and level of computer knowledge respectively.

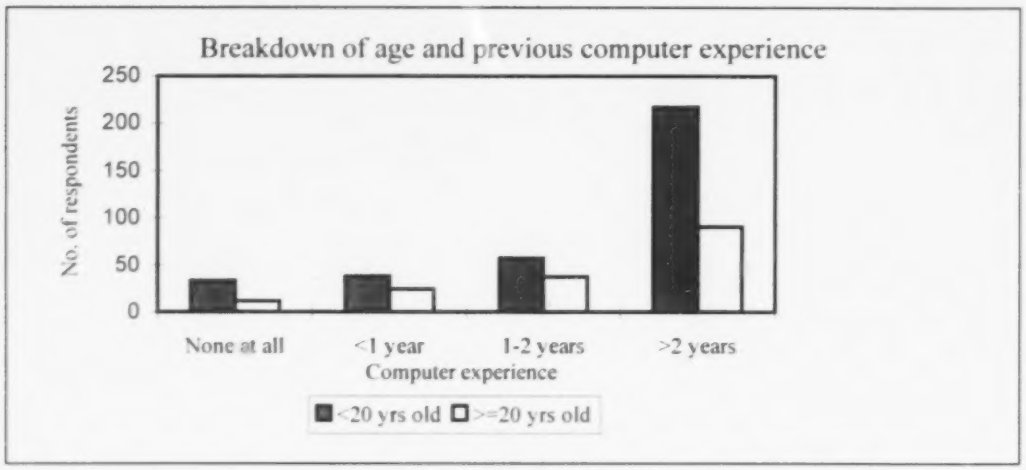

Figure 1: Breakdown of age in relation to previous computer experience

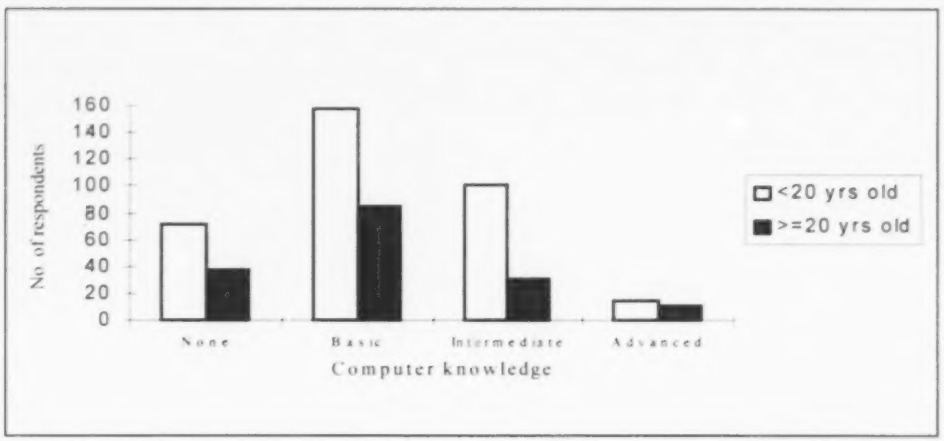

Figure 2: Breakdown of age in relation to level of computer knowledge

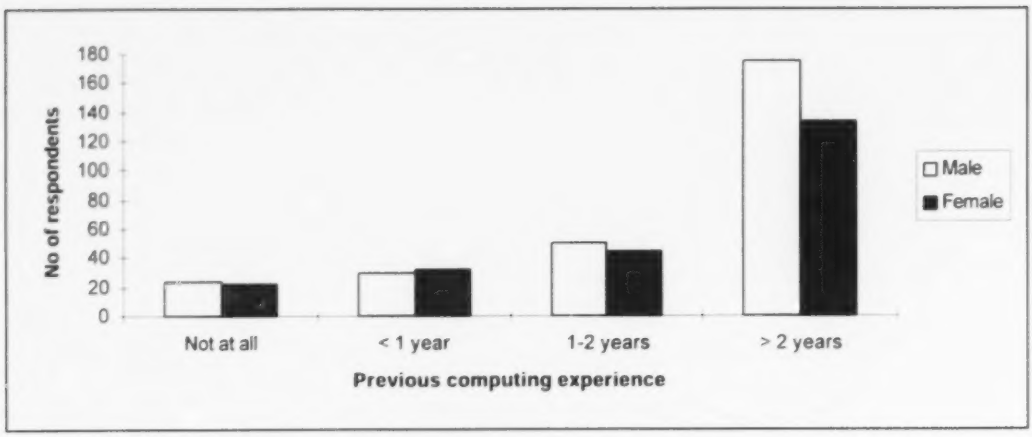

Figure 3: Breakdown of gender in relation to previous computing background

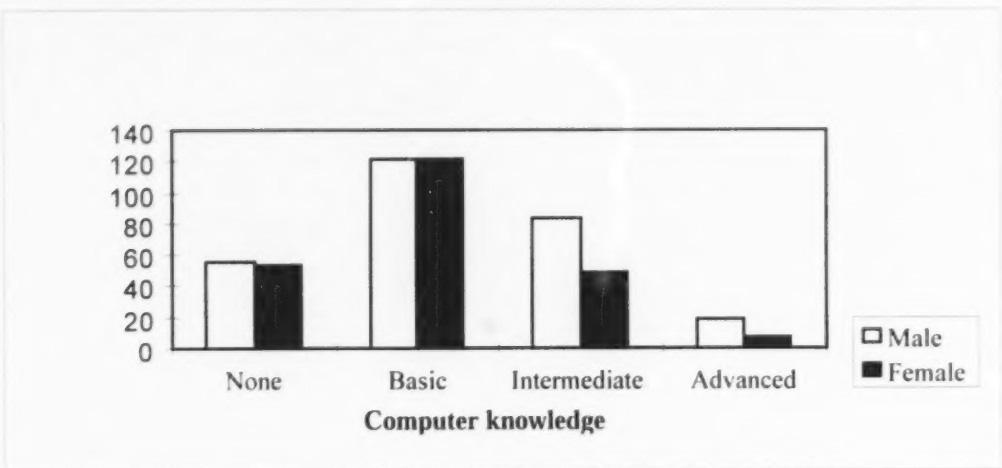

Figure 4: Breakdown of gender in relation to level of computer knowledge

3.2 Chi-square Results

Table 2 shows observed Chi-square values from comparisons between attitude and age, gender, previous computing background and level of computer knowledge. We conclude that there is no significant relationship between attitude to computing and age, and, attitude to computing and gender. However there are significant relationships between attitude to computing and previous computing background and, attitude to computing and level of computer knowledge.

Variables	Observed chi-square values
Age	0.4928
Gender	0.5734
Previous computing background	45.62*
Level of computer knowledge	32.79*

Table 2: Observed Chi-square values (* results significant at α=0.01 level)

4. Discussions

In this study, it is found that age has no significant relationship with attitude to computing. Studies have shown that although older students had less computing experience compared to younger students, they were less computer anxious. Older students also believe that they could benefit from computer technology and viewed acquisition of computer knowledge as desirable and favorable. On the other hand, younger students are more likely to use computers earlier in life than their older counterparts and therefore they are more likely to show positive attitudes to computers. It is suggested that although older students have less computer experience than younger students and they may be less confidence with computer, however they demonstrate positive liking for computer. Confidence with computers is often a result of computer knowledge and familiarity with the technology, thus age should not be a factor in influencing one's attitude to computing. Attitude can change as a result of computer knowledge and experience with computer. Our results which show age does not influence attitude to computing is consistent with that reported by [Anderson, 1996].

Our results also show that gender does not significantly influence attitude to computing. This result is encouraging as female students are no longer perceived to have a less positive attitude to computing. In a previous study conducted by the authors in 1994 [Lau et al, 1995], gender was found to significantly influence attitudes to computing. The result presented here is consistent with studies conducted for undergraduate students undertaking introductory course in information systems or computing [see Anderson, 1996; Houle, 1996] in which gender factor was found to be not influencing attitude to computing. Thus it is encouraging to note that the result presented here together with others reported elsewhere may indicate that traditional gender stereotyping and attitude to computing no longer valid.

Our study shows that there are significant relationships between previous computing background and attitude to computing, and level of computer knowledge and attitude. These results are consistent with that reported in the literature as well as consistent with a prior study conducted by the authors in 1994 [Lau et al, 1995]. Evidence [see McInerney et al, 1994] suggests that increased computer experience diminishes computer anxiety. This is because computer anxiety and attitudes towards computers use are related [Bozionelos, 1997]. In another study [see Torkzadeh and Dwyer, 1994] also suggest that computer training increases user confidence. Confidence with computers can be attributed to familiarity and computer knowledge. Lack of computer knowledge results in high anxiety and negative attitudes. It has been shown that attitude to computing can be improved significantly with training. Thus in order to reduce the anxiety of students to computing, training may be an ideal way to overcome the negative attitude to computing. [Torkzadeh and Dwyer, 1994] show that computer user training does influence user satisfaction and user confidence. However it is worth noting that increased computer experience alone will reduce computer anxiety and thus ensure a more positive attitude to computing is a simplistic view [McInerney et al, 1994]. Further research in this area needs to be conducted to confirm this view.

6. Future research

There is no consistent view on whether attitude to computing change for better or worse after attending the computing course. [Barrier and Margavio, 1993] show that student's attitude to computing do become worsen after a one-semester computing course. However [Torkzadeh and Koufteros, 1993] do not show any change in attitudes upon completion of a computing course. It is important to investigate student's change in attitude to computing. As [Simon and Wilkes, 1997] point out having a good attitude will encourage a student to learn more. It is desirable that further research to be carried out to investigate whether students change their attitudes after completion of computer course. In this study students were asked to determine their perceived level of computer knowledge in terms of their capability in using application software (word processing, spreadsheet and database) and their programming skills. In order to obtain a more accurate measure of computer knowledge, a computing test should be administered to determine individual's level of computer knowledge. A set of multiple-choice questions on computer concepts and applications can be used for this purpose [see Oliver, 1993]. Thus to investigate the change of attitude after one semester course in computing, a pre-test needs to be conducted at the beginning of the semester and then a post-test can be carried out at the end of the semester using a structured instrument.

As information technology becomes an indispensable organizational resource, top management expects its employees to be conversant with computer technology and to use the technology in all aspects of planning,

management and production operations. More and more organizations are also employing staff who are computer literate. Students from business and commerce courses are expected to be computer literate and proficient in computer software. It is not known whether professional expectation such as that described above plays a part in influencing attitude to computing. Future research should be carried out to investigate the relationship between professional motivation and attitude to computing.

7. Conclusions

In conclusion, our results show that there is no significant relationship between age and attitude to computing, and, gender and attitude to computing. However there are significant relationships between previous computing background and attitude to computing as well as between level of computer knowledge and attitude to computing.

Finally what can this study contribute to the educators, in particular educators who are involved in teaching introductory computer courses in tertiary education? As discussed previously with widespread introduction of computers in the workplace, a large number of organizations expect graduates they employed to be computer literate and be able to integrate their academic knowledge and computer technology into all aspects of their work. Universities have also included computer literacy as one of desirable attributes which students must possess when they graduate. Thus it is not surprising to see that introductory computing course has often become a compulsory unit in business degrees and programs. To this extent an introductory computing course often have large group of students with diverse background and computer skills. As indicated in this study, previous computer background and level of computer knowledge show significant influence on attitude to computing, thus educators should make deliberate efforts to find out if students possess any previous computer background. By finding out prior computer experience and level of computer knowledge, this can assist educators in planning the content, format of the course as well as assessment. As [Houle, 1996] points out that effective teaching requires detailed knowledge about the students as it impacts on students' motivation and desire to learn. It is hoped that by having detailed knowledge about students' previous computer background and level of computer knowledge and by planning a course which is appropriate to their level, it will improve students' motivation to learn more and to acquire computer skills which will be useful to them.

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